December 4, 2009

Eric F. Pastor
Pastor, Behling & Wheeler, LLC
2201 Double Creek Drive, Suite 4004
Round Rock, TX 78664

Re: Gulfco Marine Maintenance Superfund Site, Freeport, Texas
Unilateral Administrative Order, CERCLA Docket No. 06-05-05
Draft Updated Screening Level Ecological Risk Assessment (SLERA)

Dear Mr. Pastor,

The Environmental Protection Agency (EPA), the Texas Commission on Environmental Quality (TCEQ) have performed a review of the above referenced document dated May 29, 2009. The enclosed comments shall be incorporated in the referenced document and copies provided to the notification list within 15 days of receipt of this letter.

If you have any questions, please contact me at (214) 665-8318, or send an e-mail message to miller.garyg@epa.gov.

Sincerely yours,

Gary Miller, P.E.
Remediation Project Manager

Enclosure

cc: Luda Voskov (TCEQ)
Susan Roddy
Barbara Nann

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General Comments:

1. The decision made at the end of this updated SLERA document to not do any further investigation for a baseline ecological risk assessment (such as collection of tissue and toxicity testing data) is not clearly supported for the following reasons:

   a) There is concern that LOAELs and ERMs (which are to be for use in BERAs, not SLERAs) were used as decision points in this SLERA instead of (more appropriately) in a BERA following site-specific tissue data collection and toxicity testing. Rather, the risk management recommendations for remedial decision-making to be made after a BERA usually begin with a bracketed range between NOAEL-based and LOAEL-based back calculated media concentrations within which preliminary remedial goals are selected.
   b) There were some contaminants identified as bioaccumulative in Section 2.6 that were not, but should have been, included in Table 21 listing the contaminants carried forward for further evaluation in this updated SLERA (which included desktop literature-based food chain evaluations, not based on site-specific tissue data); thus, it is unclear whether hazard quotient exceedances might have occurred in this SLERA that would warrant further investigation to include site-specific tissue data collection for a BERA.
   c) There were contaminants exceeding the point of departure, the hazard quotient exceeding unity, (i.e., dibenzo(a,h)anthracene using the available individual ecotoxicity value for this PAH), and it is unclear if there would have been others given differences in Section 2.6 and Table 21.
   d) For the protection of benthos, it is not justified that 95% UCL-based contaminant concentrations using 15 acres is adequately protective of local benthic community receptors, which are more sedentary and don't have a home range size of 15 acres. This is why maximum site concentrations are more appropriate and shall be used for benthic receptors. (The use of 95% UCLs are more acceptable for other non-sedentary receptors).

2. Sediment Effects Range Medium (ERM) is not a suitable threshold for screening ecological risk. Since an ERM represents the 50^{th} percentile concentration for the ranked sediment Chemical of Potential Ecological Concern concentrations associated with a biological effect, it marks the point above which effects become probable and is not a very protective metric for risk, particularly at the screening level. However, further knowledge of potential sediment cumulative toxicity can be gained by looking at ERM values in combination as a mean quotient in multiple contaminant sites such as this. As such, an ERM quotient would be a more reliable indicator of the potential for risk to exposed ecological receptors. Therefore, we conducted a brief ERM-Quotient analysis by selecting five sediment sample locations from the north marsh area representing different mixes of COPECs and concentrations using Figure 13 from the Nature and Extent Draft Report, dated March 2, 2009. The results of this analysis (as presented in the related specific comment below) indicate a probability of toxicity to the benthic community in four of the five samples.

3. Toxicity testing and further evaluation of the benthic community within a Baseline Ecological Risk Assessment shall be completed. This is indicated by the exceedance of TCEQ PCLs and second effects levels for protection of the benthic invertebrate community, the use of 95% Upper Confidence Limits in a SLERA, and the lack of a spatial analysis of the sediment data in relation to evaluation of the benthic community. In conjunction with the revised SLERA, a Baseline Risk Assessment Problem Formulation and an Ecological Risk Assessment Work Plan, including a sampling and analysis plan, shall be submitted.

4. Dose calculations for the coyote, hawk, and green heron only take into account the dose from food ingestion and not soil (sediment) ingestion. A statement is made in the document that these doses have not been included because the proportion of incidental soil ingestion relative to food ingestion is small (2%). While the dose proportion may be small, it is important to take into account chemical dose from the incidental soil ingestion. Dose is a function of not only ingestion rate, but also of chemical concentration in the material ingested. Because concentrations of some chemicals are likely to be much higher in soil than in food, a disproportionate dose can come from soil. It is necessary to include the incidental dose from soil to the coyote and hawk, and sediment to the green heron in the dose calculations.

5. Dose calculations have intermingled wet-weight ingestion rates with dry-weight food concentrations. Food ingestion rates presented in Chapter 5 from EPA (1999) are based on wet weight, but the food concentrations calculated are in dry weight. This will tend to significantly overestimate the chemical dose from food. Either the ingestion rate or the food concentration should be corrected for percent moisture.

6. There are missing dose calculations for selected COPECs identified in Table 21. Acenaphthylene, dieldrin, endrin, and endrin ketone are shown as COPECs in North Area Soil in Table 21, but concentrations of zero have been entered into the Appendix D dose calculations, resulting in perceived acceptable risk. For the Intercoastal Waterway Sediment, Appendix G shows a concentration of zero for low-molecular-weight polycyclic aromatic hydrocarbons (LPAHs), but LPAHs are listed as a COPEC. For the Pond Sediment, Appendix I presents no concentration for LPAHs, and phenanthrene, which has been identified as a COPEC in Table 21, is not included in the risk calculations.

7. In all instances where no readily available bioaccumulation factor (BAF) or biota-sediment accumulation factor (BSAF) was available, a food concentration of zero was incorporated into the dose calculations. The absence of a BAF does not preclude the potential for bioaccumulation of the chemical into food. Assuming a food concentration of zero will minimize the dose and likely underestimate potential risks. If appropriate accumulation factors cannot be derived from the scientific literature, a default BAF of 1 should be adopted, with the soil concentration normalized to wet weight of the food item organism and incorporated into the dose calculations. This is consistent with standard methodology adopted by the EPA for screening level applications.

8. As noted in Table 21 and discussed elsewhere, "Surface water is not included in this table because they were evaluated differently given the lack of screening criteria and toxicity reference values." The WQC can be used to directly assess potential risks to the fish receptors (black drum and spotted sea trout) and the fiddler crab. Consequently, surface water comparisons to WQC should be added and treated as appropriate TRVs in the document.

9. Background Comparisons: The following statement is made in Section 2.7: "EPA guidance for conducting SLERAs (EPA, 2001) recommends that comparison with background generally not be used to remove compounds from further evaluation in order to conservatively ensure that site risks are adequately characterized. This recommendation is based on the premise that the SLERA is often conducted on limited data set prior to a comprehensive site characterization." Subsequently, the background comparison is used to eliminate contaminants of interest (COI) from the COPECs. The exact language from EPA (2001) is as follows: "While contaminants of concern may be removed from further

assessment through comparison with toxicological benchmarks, comparison with background levels generally cannot be used to remove contaminants of concern owing to the need to fully characterize site risk. Such comparisons, however, can be used effectively to focus the baseline risk assessment, if needed." Any COI claimed as background that exceeds a screening level or is bioaccumulative shall be clearly identified and carried forward to the Baseline Ecological Risk Assessment (at the very least to the uncertainty section).

10. Average exposure point concentrations are not to trump 95% UCL (reasonable maximum exposure high end values). Tables 18, 24, 25, and 26, and the Appendices, shall emphasize this to avoid the perception that COIs were pared down using average exposure point concentrations.

11. Clarification shall be provided for the food chain estimate regarding whether ingestion rate, including food and media, were maximum values and likewise whether body weight values initially were minimum values. An initial evaluation shall be made using these values. A secondary evaluation made then be done using average values.

12. Receptors evaluated for food chain analysis shall be discussed in terms of guilds rather than focusing on the individual species evaluated to represent the guild. This is to serve as a reminder that it is the guild that is being protected, not just the species being evaluated to represent the guild.

13. Toxicity Reference Values (TRVs) shall not be directly applied across classes of receptors as was done in the appendices for reptiles (i.e., bird and mammal TRVs were used to represent reptiles), and broccoli was used to represent earthworms. Where no TRVs were available for some of the contaminants, qualitative statements should be made instead to describe potential risk by comparison to why risk estimates would be expected to similar to or different from those for other classes of receptors.

14. Figures (maps) previously generated showing sample locations with hazard quotients > 1 shall be included with this document. By showing these on a map, reviewers would be able to make a determination as to concentration gradients and/or hotspots.

15. An Executive Summary and a list of acronyms shall be included with the SLERA.

16. All review comments shall be addressed in a response prior to or as an accompaniment to the next review document.

Specific Comments:

1. P. 13, Section 2.5.3 Measurement Endpoints: Surface water shall also be listed here. Also, only one measurement endpoint has been identified: comparison of soil, sediment, and surface water concentrations to appropriate ecological benchmarks. This measurement endpoint only applies to protection of fish and shellfish, soil invertebrates, and benthic organisms. A second measurement endpoint shall be added to the mammalian and avian food web dose calculations and comparison with TRVs.

2. P. 14, Section 2.6 Selection of and Comparison to Ecological Benchmarks: COIs identified as bioaccumulative but not included in Table 21 shall be included in Table 21 to carry forward.

3. P. 16, Section 2.6.2 Sediment and Tables 6-9: There appears to be some confusion over the terminology regarding TCEQ's sediment benchmarks. The midpoint value between the initial and second effects level benchmarks is considered to be the default sediment PCL for protection of the benthic community for a particular COPEC. As stated in the related general comment, site COPEC sediment concentrations should not be compared to the second effects levels (most of which are ERMs) as these are probable effects levels.

4. P. 21, Section 3.1.1 Terrestrial Receptors: It is important that small mammalian receptors of various feeding guilds be represented in a SLERA because of their potential to maximize exposure through their small body weight and narrow home range and because they serve as primary food sources to other receptors. Therefore, it is preferred that both an omnivore that eats mostly invertebrates (e.g., Least shrew) and a herbivore that eats mostly plant matter (e.g., Deer mouse, White-footed mouse) be evaluated as opposed to a single omnivore that eats 50% invertebrates and 50% plant matter. The Least shrew's diet should be evaluated as 90% invertebrates, 10% plant matter, and 8% incidental soil ingestion and the herbivorous mammal's diet should be evaluated as 90% plant matter, 10% invertebrates, and 2% incidental soil ingestion (see the related specific comment).

5. P. 25, Section 3.2 Screening-Level Exposure Estimates: It is unclear what is meant by the use of dietary concentration rather than daily dose for second order carnivorous fish, mammals, and birds, and whether its use was appropriate. An explanation of dietary concentration shall be provided.

6. P. 25, Section 3.2 Screening-Level Exposure Estimates: The second sentence of the first paragraph ("For second order carnivorous fish…") needs to be explained and/or clarified. This statement is not reflected in the conceptual site models (Figures 4 and 5) nor does there appear to be any indication that Toxicity Reference Values (TRVs) were based on tissue data. Also, the methodology and results of the fish measurement receptors evaluation shall be clarified with the text.

7. P. 27, Section 3.2 Screening-Level Exposure Estimates and related appendices: Regarding incidental soil ingestion, the percent soil ingested can be calculated by dividing the soil ingestion rate by the food ingestion rate, assuming both are in the same units and moisture content (wet weight vs. dry weight). This calculation revealed that the soil ingested by the Deer mouse (0.2%) and the Robin (3.2%) is substantially lower than it should be. It is understood that these rates were obtained from traditional sources for ERA inputs. Nevertheless, these percentages shall be higher (2.0% and 5.2%, respectively). All other incidental soil/sediment ingestion percentages for the other evaluated receptors appear reasonable.

8. P. 31, Section 3.4.8 Surface Water : water quality criteria (WQC) qualify as benchmark screening values, and shall be presented similarly to the hazard quotient presentations for all other media. While it is true that dietary exposure to contaminants is not considered in WQC, the direct toxic effects to aquatic organisms are better assessed by incorporating gill uptake and direct contact as exposure pathways, which is what has been used to establish the WQC. Further, the extensive discussion based on the concentration in water having

50% chance of causing death to aquatic life, or LC 50, related to these contaminants is unclear and not appropriate; evaluation of toxicological data based on chronic endpoints is more appropriate. It was not clearly stated in this Section that a LC 50 value is not an appropriate screening value and was not to be used without conversion factors to convert LC 50 values to LOAELs and NOAELs. Also, in Table 27, LC 50 values (unmodified with conversion factors) are presented and appear to be used inappropriately. Also, if the contaminants (for which LC 50 values were obtained) already had Texas Water Quality Standards, the Texas Water Quality Standards should be used in preference to the LC 50 values obtained. It seemed from the discussion that there was a search for studies of a 96 hour duration, studies using saltwater, and studies using species native to Texas. Yet, in the description, there were exceptions made to these search criteria, which generates more questions and uncertainty. Also, where there were multiple LC 50 values obtained for a contaminant, the justification for enough data points for calculation of a geometric mean was not adequately described as supported (such as that done in the protocols used for calculation for federal ambient water quality criteria, or as that done in the SOPs used for quality control in identifying adequacy of literature values used in calculation of geometric means for EPA's ESSLs). The LC 50 discussions shall be replaced with the more appropriate chronic endpoints.

9. P. 31, Section 3.4.8 Surface Water : The decision described regarding bioaccumulative contaminants identified in surface water (from Section 2.6) was to conduct no additional quantitative evaluation because, while detected, the 3 bioaccumulative contaminants (mercury, selenium, and thallium) were not measured above the screening criteria for surface water. This decision seems to contradict the logic of the decision made for other medium's contaminants that when bioaccumulative contaminants were detected, they were carried forward for the desktop literature-based food chain estimations done in this updated SLERA.

10. P. 34, Section 4.0 uncertainty Analysis for Steps 1 and 2: In this section, revisions to reflect more accurately the SLERA risk estimates shall be made regarding any statements postulating overestimate of risk in light of comments made above.

11. P. 41, Section 5.1.1 Soil and Sediment: in the next-to-last bullet, the last sentence states that "no other LOAEL or ERM-based HQs for North Area wetlands sediment exceed 1 for the other ROPCs". However, the AET-based HQs for the RME EPC for benzo (g,h,i) perylene and indeno (1,2,3-cd) pyrene do exceed 1, for the benthic receptor, and that shall be included in the discussion. Also, in the last bullet, it is stated that "none of the ERM or LOAEL-based HQs in pond sediment is greater than 1". However, the sandpiper NOAEL-based HQ for the RME EPC for nickel exceeds 1, and that shall be included in the discussion.

12. P. 42, Section 5.1.1 Soil and Sediment and Table 8: TCEQ (2005) guidance appears to have been misused to screen out dibenzo(a,h)anthracene. As this COPEC exceeds its second effects level, it should be retained beyond screening to ensure that disproportionate concentrations within the mixture are not masked by the total. Also, as naphthalene was not included in the list of chemicals of interest in Table 8 and as it is one of the thirteen parent PAH compounds, it is appropriate to use a proxy value for it in order to correctly utilize the Total PAH benchmark (TCEQ, 2006).

13. P. 44, Section 5.3 Scientific Management Decision Point: We do not concur with the conclusion that adverse ecological risks are unlikely. As part of the SLERA review,

select surface sediment data for the marsh area north of Marlin Ave. was evaluated through the mean ERM-Quotient approach as described in Long, et al. (1998). When evaluating the resulting quotients using the methodology of Long and McDonald (1998), the resulting probabilities of toxicity to benthic organisms exhibited a gradient of results that exceeded 20% for multiple locations. It is expected that other sample locations (e.g., 2WSED3) with comparable COPEC mixtures and concentrations would likely exhibit similar probabilities of toxicity. A summary of the mean ERM-Quotient results is provided below.

Sample Location	ERM-Quotient	Probability of Toxicity
2WSED4	0.68	56%
2WSED17	0.55	52%
NB4SE08	0.37	45%
NF4SE13	0.16	28%
NB2SE06	0.04	3%

14. Tables: Avian and mammalian TRVs were used for the Rat snake. Cross-class extrapolations in order to obtain TRVs are not appropriate. The food web calculations for crustaceans, fish, and snakes, and the resulting risk estimates should be eliminated from the document. Rather, the following approach shall be used for the assessment of risks to these receptors:

    a. Benthic Community Guild (Fiddler Crab) – The National Oceanic and Atmospheric Administration's ERL values are designed to be protective of benthic organisms; these values provide a more reasonable comparison than the food-web basis currently presented. In addition, water quality criteria are designed for the protection of not only fish, but all aquatic organisms; consequently, the use of WQC would also be appropriate for the fiddler crab.
    b. Fish (Black Drum and Spotted Sea Trout) - The use of WQC is appropriate for estimation of risks to these receptors, especially given the role direct contact and gill uptake play in aquatic exposures.
    c. Reptile Guild (Rat Snake) - There are no appropriate TRVs for assessment of risks to the rat snake. The best that can be done for this receptor is a qualitative assessment based on a weight-of-evidence approach that considers the following questions: Is there qualitative toxicological information that indicates source-related chemicals may produce toxic effects on reptiles? Is the habitat appropriate? Are there appropriate food resources available to support a rat snake population? Are there other stressors (e.g., the road) that may pose more risk than chemical contaminants?

15. Tables 6-9: Footnote 4 on all of these tables reads "From Table 2 of EPA's EcoTox Update January, 2006." Footnote 4 shall correctly read "From Table 2 of EPA's EcoTox Update January, 1996."

16. Table 18: Plants are not included in Table 18; plants shall be included in this table

17. Tables 18 and 19 <u>Assessment and Measurement Endpoints:</u> The measurement endpoint for mammalian and avian receptors is incorrect, and shall reflect the calculation of chemical dose and comparison to TRVs, not comparison of measured concentrations to benchmark screening values. Are the comparisons based on Brad Samples wildlife toxicity values? Also, dose calculations for fish, the rat snake, and the fiddler crab are not scientifically sound due to the absence of appropriate TRVs. For fish and crab, the measurement

endpoints should be redefined as the comparison of surface water or sediment concentrations to benchmarks.

18. Plate 1: Zones 1 through 4 are presented in the Intracoastal Waterway and grid patterns are presented in the north and south land areas. However, there is no discussion of these zones or grids in the text. These zones and grid features shall be referenced in the text.

References:

Long, E.R., L. J. Field and D.D. McDonald. 1998. Predicting Toxicity in Marine Sediments with Numerical Sediment Quality Guidelines. Environmental Toxicology and Chemistry, Vol. 17, No. 4, pp. 714–727.

Long, E.R. and D.D. McDonald. 1998. Perspective: Recommended Uses of Empirically Derived, Sediment Quality Guidelines for Marine and Estuarine Ecosystems. Human and Ecological Risk Assessment, Vol. 4, No. 5, pp. 1019-1039.

TCEQ. 2005. Position Paper on Common Issues Encountered During the Review of Ecological Risk Assessments. September. http://www.tceq.state.tx.us/remediation/eco/eco.html

TCEQ. 2006. Update to Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas RG-263 (Revised). January.